

# Apurba Paul

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## Work Experience

### Department of Physics and Astronomy, Clemson University Clemson, USA

*Postdoctoral Fellow*

2019–Now

Postdoc supervisors: Dr. Joshua Alper, Dr. Kimberly Paul, Dr. Lukasz Kazbousky.  
Working on to study the biophysics of motility of *T. brucei* and the biophysics of septin formation.

### Department of Physics, IISc

Bangalore, India

*Research Associate*

2017–2018

Was working on to setup dual trap in optical tweezers to stretch and measure the normal and malaria infected RBC.

## Education

### Indian Institute of Science

Bangalore, India

*Ph.D.*

2017

Studying properties of malaria infected Red Blood Cells (RBC) using Optical Tweezers

### University of Kalyani

Kalyani, WB, India

*M.Sc., 1<sup>st</sup> class*

2008

Special Paper: *Solid state physics*

### Kandi Raj Collage

Kandi, WB, India

*B.Sc. (Hons), 2<sup>nd</sup> class*

2006

Affiliated to: *University of Kalyani*

Subject: *Physics (Hons), Chemistry, Mathematics*

## Scholarships/Achievements

**2008: Joint Entrance Screening Test (JEST)**, All India rank: 28, Percentile: 99.33, Year: 2008

**2008: The Graduate Aptitude Test in Engineering (GATE)**, All India rank: 146, Percentile: 98.47, Year: 2008

**2009: National Eligibility Test (NET)**, CSIR-JRF category

**2019: Clemson University Post Doctoral Fellowship**, Clemson University, Clemson, USA

## Research Experience

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- My PhD work consists of studying and comparing infected and healthy Red Blood Cells (RBCs) using optical tweezers. First, we have shown that the corner frequency of RBC increases due to malaria infection. More interestingly, it has been observed that the RBCs which are not hosting the parasite, also show a similar increase in corner frequency. We called it as “bystander effect”. It has been shown that bystander effect can be observed in both cultured as well as clinical samples. We have observed the bystander effect in both *P. falciparum* and *P. vivax* infection. It has been found out that db-cAMP might be one of the substances which is responsible for the bystander effect.
- As an RA, I set up the dual trap to measure the elasticity of RBC using optical tweezers. We wanted to confirm the bystander effect using this technique. The project will be carried forward by other students in the lab. I have also helped my supervisor to write a grant proposal for the same project, which was granted.
- Currently, as a postdoctoral fellow at Clemson University, I am working on two different project. One using *trypanosoma brucei* and another using *criptococcus neoformans*. I first project we are studying the biophysics of the motility of *t. brucei* and the role of motility in survival of the parasite. In the second project, I am investigating the role of SHS1 in septin formation.

## Publications

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- **Apurba Paul**, Ghania Ramdani, Utpal Tatu, Gordon Langsley, and Vasant Natarajan. Studying the rigidity of red blood cells induced by plasmodium falciparum infection. *Scientific reports*, 9(1):1–4, 2019.
- **Apurba Paul**, Ponnai Padmapriya, and Vasant Natarajan. Diagnosis of malarial infection using change in properties of optically trapped red blood cells. *biomedical journal*, 40(2):101–105, 2017.
- **Apurba Paul**, Rani Pallavi, Utpal S Tatu, and Vasant Natarajan. The bystander effect in optically trapped red blood cells due to plasmodium falciparum infection. *Transactions of The Royal Society of Tropical Medicine and Hygiene*, 107(4):220–223, 2013.
- Vishal Saraogi, P Padmapriya, **Apurba Paul**, Utpal S Tatu, and Vasant Natarajan. Change in spectrum of brownian fluctuations of optically trapped red blood cells due to malarial infection. *Journal of biomedical optics*, 15(3):037003, 2010.

## Teaching Experience

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- I worked as a teaching assistant (TA) for students of 4 year Bachelor Science (BS) Program of Indian Institute of Science, Bangalore. I was TA for August 2012 to December 2012. I was involved in teaching them laboratory experiments and conducting tutorial classes. I have evaluated their assignments and semester exams.
- Alongside with my PhD work, I also have supervised summer trainees and junior postgraduate students in their research projects and it's over all planning, which has yielded valuable data.

## Conference/Workshop

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- **EMBO-Young Scientist Network Meeting 2013**: EMBO India Bioscience Initiative, NCBS, Bangalore, India 7–10 Nov 2013
- **National Conference on Cell Mechanics and Interactions at the Physics Biology Interface (NCCMI)**, Bangalore University, Bangalore, India, 30<sup>th</sup> & 31<sup>st</sup> Aug 2013
- **Frontiers in Modern Biology**, Department of Biochemistry, Indian Institute of Science, Bangalore, India, 2013
- **International Conference on Quantum Information and Quantum Computation**, Department of Physics, Indian Institute of Science, Bangalore, India, 13–18<sup>th</sup> Jan 2013
- **School on Atomic Physics**, By IISER Pune on Goa, India, 17–23<sup>rd</sup> Dec. 2012
- **3<sup>rd</sup> International Conference of Current Development in Atomic, Molecular, Optical and Nano Physics with Application (CDAMOP)**, Department of Physics, Delhi University, Delhi, India, 14–16<sup>th</sup> Dec. 2011
- **Workshop on Physics of DNA**, Department of Physics, Banaras Hindu University, Varanashi, India, 11–13<sup>th</sup> Aug. 2010
- **Workshop on Fiber Optics and Application**, IEEE Photonic Society, Bangalore IEEE Photonic Society, PESIT, Bangalore, 16<sup>th</sup> April 2010
- **Frontiers and Direction in Condensed Matter Physics**, Department of Physics, Indian Institute of Science, Bangalore, India, 25–29<sup>th</sup> May 2009
- **The IISc Centenary Conference**, Indian Institute of Science, Bangalore, India, 13–16<sup>th</sup> Dec. 2009
- **Recent Trends in Physics Research**, Department of Physics, University of Kalyani, Kalyani, West Bengal, India, 8<sup>th</sup> March 2008

## Skills

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### Experimental Skills.....

**Equipment:** Optical Tweezers, Microscope, High speed camera, FPGA, FPLC

**Optical Tweezers:** Force measurement, Optical alignment, Electronics, Interfacing

**Video analysis:** Particle tracking, Shape analysis

**Biochemistry:** Plasmid transformation, Miniprep, Protein expression and purification, FPLC

**Microscopy:** Simple imaging (bright field, dark field, ph, dic)

### Soft Skills.....

**Interfacing:** LabView

**Data Analysis:** Igor, Qtiplot

**Scientific:** Matlab, Mathematica, Octave, Maxima, Python

**Typography:**  $\text{\LaTeX}$ , MS Office, Libre Office

**Graphics:** Inkscape, Gimp, Adobe AIR

**OS:** Ubuntu, Windows

## Synergistic activities

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- **Treasurer, Clemson University Postdoctoral Association (CUPDA), 2019 – Now:** Main responsibility of the job is to keep track of the expenditure of CUPDA. Also as an executive member, I am involved in some of the decisions making process.
- **Poster and presentation Judge, Clemson Biological Sciences Annual Student Symposium (CBASS), April 2019:** The responsibility was to see the posters and presentations and then mark them accordingly so that top three student from each category can be chosen.
- **Volunteer, International Conference on Quantum Information and Quantum Computation (ICQIQ), IISc, Bangalore, India, Jan 2013:** served as a volunteers to help organize the conference.
- **Volunteer, Open Day, IISc, Bangalore, India, 2009–2016:** Open day is a annual science outreach program by IISc. Thousands of young school and college students comes to see demo. The program was initiated to encourage the young students to pursuit science and technology in their career. I have volunteered both to demonstrate scientific experiments and to do the crowd management. I served as volunteer each year from 2009 to 2016.
- **Volunteer, Vijyoshi National Science Camp By KVPY, IISc, Bangalore, India, 2010–2013:** Vijyoshi is an annual, weekly science camp organized by KVPY and INSPIRE for selected school students from all over India. I served as volunteer to help manage the transportation and accommodation of the attending students. I have served as volunteer each year from 2010 to 2013.
- **General Secretary, Hall Day committee, PG-III hostel, Kalyani University, Kalyani, WB, India, 2007–2008:** Helped to organize the Hall day and the annual reunion of the hostel.
- **Auditor, PG-III hostel, Kalyani University, Kalyani, WB, India, 2007–2008:** As auditor my responsibility was to audit the monthly expenditure of the hostel.
- **General Secretary, Departmental reunion committee, Department of Physics, Kalyani University, Kalyani, WB, India, 2006–2007:** Helped to organize the annual reunion of the department.

## Languages

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**English:** Read, Write and Speak

*Fluent*

**Bengali:** Read, Write and Speak

*Native*

**Hindi:** Read and Speak

## Interest

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**Sports:** Football, Cricket, Badminton, Swimming

**Other:** Travelling and Photography